

0067664

**SAF-B05-033
600-259 Verification
FINAL VALIDATION PACKAGE**

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan 2 copies clipped

mjo 11/08/05
INITIAL DATE

SDG H3334 SAF-B05-033

Waste Site: 600-259 Lysimeter Site

RECEIVED
NOV 16 2005
EDMC

Date: 4 November 2005
To: Washington Closure Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 600-259 Verification – Waste Site 600-259
Subject: Radiochemistry - Data Package No. H3334-EB

INTRODUCTION

This memo presents the results of data validation on Data Package No. H3334-EB prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

| Sample ID | Sample Date | Media | Validation | Date |
|-----------|-------------|-------|------------|------------|
| J03WM5 | 8/23/05 | Soil | C | See note 1 |
| J03WM6 | 8/23/05 | Soil | C | See note 1 |
| J03WM7 | 8/23/05 | Soil | C | See note 1 |
| J03WM8 | 8/23/05 | Soil | C | See note 1 |
| J03WM9 | 8/23/05 | Soil | C | See note 1 |
| J03X41 | 8/23/05 | Soil | C | See note 1 |
| J03X42 | 8/23/05 | Soil | C | See note 1 |

1 – Gamma spectroscopy, tritium and technetium-99.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 300 Area Remedial Action Sampling and Analysis Plan (DOE/RL-2001-48, June 2004). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client

DATA QUALITY PARAMETERS

• Holding Times

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

000001

- **Preparation (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% and tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate

analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

Field Duplicates

One set of field duplicate samples (J03WM5/J03WM9) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. Five analytes exceeded the RQL. Under the WCH statement of work, no qualification is required.

- **Completeness**

Data package No. H3334 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the lack of a matrix spike analysis, all tritium results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

WCH, Contract #20266, *Validation Statement of Work*, Washington Closure Hanford Incorporated, July 7, 2003.

DOE/RL-2001-48, Rev. 1, *300 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, June 2004.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2
Summary of Data Qualification

000007

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

| SDG: H334 | REVIEWER: TLI | Project: 600-259 | PAGE <u>1</u> OF <u>1</u> |
|------------------|------------------|------------------|---------------------------|
| COMMENTS: | | | |
| COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| Tritium | J | All | No matrix spike analysis |

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

| Project: WASHINGTON CLOSURE HANFORD | | | | | | | | | | | | | | | |
|-------------------------------------|------------|--------|---------|--------|---------|--------|-----------|--------|---------|-------|---------|--------|---------|--------|----|
| Laboratory: LLI | SDG: H3334 | | | | | | | | | | | | | | |
| Sample Number | J03WM5 | | J03WM6 | | J03WM7 | | J03WM8 | | J03WM9 | | J03X41 | | J03X43 | | |
| Remarks | | | | | | | Duplicate | | | | | | | | |
| Sample Date | 8/23/05 | | 8/23/05 | | 8/23/05 | | 8/23/05 | | 8/23/05 | | 8/23/05 | | 8/23/05 | | |
| Radiochemistry | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | |
| Tritium | 400 | -0.949 | UJ | -3.02 | UJ | -3.19 | UJ | -3.38 | UJ | -1.61 | UJ | -1.37 | UJ | -2.29 | UJ |
| Technetium-99 | 15 | 0.001 | U | -0.021 | U | -0.133 | U | -0.107 | U | 0.027 | U | -0.038 | U | -0.010 | U |
| Potassium-40 | | 11.0 | | 11.4 | | 11.3 | | 11.2 | | 10.9 | | 13.0 | | 6.80 | |
| Manganese-54 | | UU | | UU | | UU | | UU | | UU | | UU | | UU | |
| Cobalt 60 | 0.05 | UU | | UU | | UU | | UU | | UU | | UU | | UU | |
| Ruthenium 103 | | UU | | UU | | UU | | UU | | UU | | UU | | UU | |
| Cesium 137 | 0.1 | UU | | 0.068 | | 0.022 | | UU | | UU | | UU | | 0.038 | |
| Radium-226 | 0.2 | 0.351 | | 0.372 | | 0.378 | | 0.441 | | 0.444 | | 0.392 | | 0.274 | |
| Radium-228 | | 0.557 | | 0.642 | | 0.657 | | 0.646 | | 0.593 | | 0.628 | | 0.412 | |
| Europium 152 | 0.2 | UU | | UU | | UU | | UU | | UU | | UU | | UU | |
| Europium 154 | 0.1 | UU* | | UU* | | UU | | UU | | UU* | | UU* | | UU | |
| Europium 155 | 0.1 | UU | | UU | | UU | | 0.087 | | UU | | UU* | | UU | |
| Thorium-228 | | 0.479 | | 0.511 | | 0.486 | | 0.494 | | 0.501 | | 0.463 | | 0.441 | |
| Thorium-232 | | 0.557 | | 0.642 | | 0.657 | | 0.646 | | 0.593 | | 0.628 | | 0.412 | |
| Uranium-235(gea) | | UU | | UU | | UU | | UU | | UU | | UU | | UU | |
| Uranium-238(gea) | | UU | | UU | | UU | | UU | | UU | | UU | | UU | |
| Americium-241(gea) | | UU | | UU | | UU | | UU | | UU | | UU | | UU | |

010000

*- RQL exceeded

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3334

R508177-01

J03WM5

DATA SHEET

SDG 7709
Contact Melissa C. Mannion

Client/Case no Hanford
Contract No. 630

SDG H3334

Lab sample id R508177-01
Dept sample id 7709-001
Received 08/24/05
% solids 98.8

Client sample id J03WM5
Location/Matrix 600-259 Lysimeter Site SOLID
Collected/Weight 08/23/05 10:05 1377 g
Custody/SAF No B05-033-01 B05-033

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|----------------|------|
| Tritium | 10028-17-8 | -0.949 | 3.0 | 5.2 | 400 | U | H |
| Technetium 99 | 14133-76-7 | 0.001 | 0.16 | 0.39 | 15 | U | TC |
| Potassium 40 | 13966-00-2 | 11.0 | 0.83 | 0.46 | | GAM | |
| Manganese 54 | 13966-31-9 | U | | 0.034 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.041 | 0.050 | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.049 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.033 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.351 | 0.068 | 0.071 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.557 | 0.16 | 0.16 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.083 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.14 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.092 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.479 | 0.038 | 0.039 | | | GAM |
| Thorium 232 | TH-232 | 0.557 | 0.16 | 0.16 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.13 | | U | GAM |
| Uranium 238 | U-238 | U | | 4.4 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.12 | | U | GAM |

600-259 Verification

11/4/05

DATA SHEETS

Page 1

SUMMARY DATA SECTION

Page 11

000011

| | |
|-------------|----------|
| Lab id | EBRLNE |
| Protocol | Hanford |
| Version | Ver 1.0 |
| Form | DVD-DS |
| Version | 3.06 |
| Report date | 09/08/05 |

E B E R L I N E S E R V I C E S / R I C H M O N D
SAMPLE DELIVERY GROUP H3334

R508177-02

J03WM6

D A T A S H E E T

| | | |
|------------------------------------------------------|----------------------------------------------------------|------------------|
| SDG <u>7709</u> Contact <u>Melissa C. Mannion</u> | Client/Case no <u>Hanford</u> Contract No. <u>630</u> | SDG <u>H3334</u> |
| Lab sample id <u>R508177-02</u> | Client sample id <u>J03WM6</u> | |
| Dept sample id <u>7709-002</u> | Location/Matrix <u>600-259 Lysimeter Site</u> | <u>SOLID</u> |
| Received <u>08/24/05</u> | Collected/Weight <u>08/23/05 10:12</u> | <u>1491 g</u> |
| % solids <u>99.3</u> | Custody/SAF No <u>B05-033-01</u> | <u>B05-033</u> |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -3.02 | 3.1 | 5.5 | 400 | U J | H |
| Technetium 99 | 14133-76-7 | -0.021 | 0.13 | 0.37 | 15 | U | TC |
| Potassium 40 | 13966-00-2 | 11.4 | 0.86 | 0.40 | | | GAM |
| Manganese 54 | 13966-31-9 | U | | 0.032 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.039 | 0.050 | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.051 | | U | GAM |
| Cesium 137 | 10045-97-3 | 0.068 | 0.038 | 0.044 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.372 | 0.077 | 0.087 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.642 | 0.15 | 0.16 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.089 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.13 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.10 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.511 | 0.043 | 0.043 | | | GAM |
| Thorium 232 | TH-232 | 0.642 | 0.15 | 0.16 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.14 | | U | GAM |
| Uranium 238 | U-238 | U | | 4.9 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.13 | | U | GAM |

600-259 Verification

PL
11/4/05

DATA SHEETS
Page 2
SUMMARY DATA SECTION
Page 12

000012

| |
|-----------------------------|
| Lab id <u>EBRLNE</u> |
| Protocol <u>Hanford</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>09/08/05</u> |

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3334

R508177-03

J03WM7

DATA SHEET

| | | |
|-----------------------------------|-----------------------------------------------|------------------|
| SDG <u>7709</u> | Client/Case no <u>Hanford</u> | SDG <u>H3334</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| Lab sample id <u>R508177-03</u> | Client sample id <u>J03WM7</u> | |
| Dept sample id <u>7709-003</u> | Location/Matrix <u>600-259 Lysimeter Site</u> | <u>SOLID</u> |
| Received <u>08/24/05</u> | Collected/Weight <u>08/23/05 10:23</u> | <u>1426 g</u> |
| % solids <u>99.1</u> | Custody/SAF No <u>B05-033-01</u> | <u>B05-033</u> |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -3.19 | 3.1 | 5.4 | 400 | U T | H |
| Technetium 99 | 14133-76-7 | -0.133 | 0.13 | 0.37 | 15 | U | TC |
| Potassium 40 | 13966-00-2 | 11.3 | 0.66 | 0.19 | | | GAM |
| Manganese 54 | 13966-31-9 | U | | 0.028 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.033 | 0.050 | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.038 | | U | GAM |
| Cesium 137 | 10045-97-3 | 0.022 | 0.021 | 0.028 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.378 | 0.062 | 0.062 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.657 | 0.14 | 0.14 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.070 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.10 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.095 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.486 | 0.034 | 0.032 | | | GAM |
| Thorium 232 | TH-232 | 0.657 | 0.14 | 0.14 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.12 | | U | GAM |
| Uranium 238 | U-238 | U | | 4.0 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.21 | | U | GAM |

600-259 Verification

[Handwritten signature]
11/4/05

DATA SHEETS
Page 3
SUMMARY DATA SECTION
Page 13

000013

| |
|-----------------------------|
| Lab id <u>EBRLINE</u> |
| Protocol <u>Hanford</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>09/08/05</u> |

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3334

R508177-04

J03WM8

DATA SHEET

| | | |
|----------------------------------------|----------------------------------------------|-----------|
| SDG 7709 Contact Melissa C. Mannion | Client/Case no Hanford Contract No. 630 | SDG H3334 |
| Lab sample id R508177-04 | Client sample id J03WM8 | |
| Dept sample id 7709-004 | Location/Matrix 600-259 Lysimeter Site SOLID | |
| Received 08/24/05 | Collected/Weight 08/23/05 10:39 1435 g | |
| % solids 98.7 | Custody/SAF No B05-033-01 B05-033 | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -3.38 | 3.0 | 5.3 | 400 | U J | H |
| Technetium 99 | 14133-76-7 | -0.107 | 0.16 | 0.55 | 15 | U | TC |
| Potassium 40 | 13966-00-2 | 11.2 | 0.62 | 0.27 | | | GAM |
| Manganese 54 | 13966-31-9 | U | | 0.027 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.028 | 0.050 | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.036 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.027 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.441 | 0.060 | 0.058 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.646 | 0.13 | 0.13 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.064 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.094 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | 0.087 | 0.061 | 0.093 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.494 | 0.032 | 0.031 | | | GAM |
| Thorium 232 | TH-232 | 0.646 | 0.13 | 0.13 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.11 | | U | GAM |
| Uranium 238 | U-238 | U | | 3.3 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.20 | | U | GAM |

600-259 Verification

✓
11/4/05

DATA SHEETS
Page 4
SUMMARY DATA SECTION
Page 14

000014

| |
|----------------------|
| Lab id EBRINE |
| Protocol Hanford |
| Version Ver 1.0 |
| Form DVD-DS |
| Version 3.06 |
| Report date 09/08/05 |

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3334

R508177-05

J03WM9

DATA SHEET

| | | |
|-----------------------------------|-----------------------------------------------|------------------|
| SDG <u>7709</u> | Client/Case no <u>Hanford</u> | <u>SDG H3334</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| Lab sample id <u>R508177-05</u> | Client sample id <u>J03WM9</u> | |
| Dept sample id <u>7709-005</u> | Location/Matrix <u>600-259 Lysimeter Site</u> | <u>SOLID</u> |
| Received <u>08/24/05</u> | Collected/Weight <u>08/23/05 10:05</u> | <u>1445 g</u> |
| % solids <u>98.8</u> | Custody/SAF No <u>B05-033-01</u> | <u>B05-033</u> |

| ANALYTE | CAS NO | RESULT pCi/g | 2 σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -1.61 | 3.0 | 5.3 | 400 | U T | H |
| Technetium 99 | 14133-76-7 | 0.027 | 0.17 | 0.55 | 15 | U | TC |
| Potassium 40 | 13966-00-2 | 10.9 | 0.92 | 0.46 | | | GAM |
| Manganese 54 | 13966-31-9 | U | | 0.037 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.045 | 0.050 | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.056 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.039 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.444 | 0.081 | 0.079 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.593 | 0.22 | 0.23 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.094 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.14 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.10 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.501 | 0.046 | 0.048 | | | GAM |
| Thorium 232 | TH-232 | 0.593 | 0.22 | 0.23 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.15 | | U | GAM |
| Uranium 238 | U-238 | U | | 5.2 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.15 | | U | GAM |

600-259 Verification

[Signature]
11/4/05

DATA SHEETS
Page 5
SUMMARY DATA SECTION
Page 15

000015

| |
|-----------------------------|
| Lab id <u>EBRLNE</u> |
| Protocol <u>Hanford</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>09/08/05</u> |

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3334

R508177-06

J03X41

DATA SHEET

| | | |
|-----------------------------------|-----------------------------------------------|------------------|
| SDG <u>7709</u> | Client/Case no <u>Hanford</u> | SDG <u>H3334</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| Lab sample id <u>R508177-06</u> | Client sample id <u>J03X41</u> | |
| Dept sample id <u>7709-006</u> | Location/Matrix <u>600-259 Lysimeter Site</u> | <u>SOLID</u> |
| Received <u>08/24/05</u> | Collected/Weight <u>08/23/05 10:43</u> | <u>1258 g</u> |
| % solids <u>98.5</u> | Custody/SAF No <u>B05-033-03</u> | <u>B05-033</u> |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -1.37 | 3.1 | 5.3 | 400 | U J | H |
| Technetium 99 | 14133-76-7 | -0.038 | 0.22 | 0.57 | 15 | U | TC |
| Potassium 40 | 13966-00-2 | 13.0 | 0.83 | 0.34 | | | GAM |
| Manganese 54 | 13966-31-9 | U | | 0.034 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.036 | 0.050 | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.042 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.036 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | 0.392 | 0.068 | 0.065 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.628 | 0.14 | 0.14 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.080 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.13 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.11 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.463 | 0.040 | 0.041 | | | GAM |
| Thorium 232 | TH-232 | 0.628 | 0.14 | 0.14 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.14 | | U | GAM |
| Uranium 238 | U-238 | U | | 4.2 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.23 | | U | GAM |

600-259 Verification



11/4/08

DATA SHEETS
Page 6
SUMMARY DATA SECTION
Page 16

000016

| |
|-----------------------------|
| Lab id <u>EBRLNE</u> |
| Protocol <u>Hanford</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>09/08/05</u> |

E B E R L I N E S E R V I C E S / R I C H M O N D
SAMPLE DELIVERY GROUP H3334

R508177-07

J03X42

D A T A S H E E T

| | | |
|-----------------------------------|-----------------------------------------------|------------------|
| SDG <u>7709</u> | Client/Case no <u>Hanford</u> | SDG <u>H3334</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| Lab sample id <u>R508177-07</u> | Client sample id <u>J03X42</u> | |
| Dept sample id <u>7709-007</u> | Location/Matrix <u>600-259 Lysimeter Site</u> | <u>SOLID</u> |
| Received <u>08/24/05</u> | Collected/Weight <u>08/23/05 10:49</u> | <u>1532 g</u> |
| % solids <u>99.1</u> | Custody/SAF No <u>B05-033-03</u> | <u>B05-033</u> |

| ANALYTE | CAS NO | RESULT pCi/g | 2 σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -2.29 | 2.9 | 5.2 | 400 | U J | H |
| Technetium 99 | 14133-76-7 | -0.010 | 0.16 | 0.53 | 15 | U | TC |
| Potassium 40 | 13966-00-2 | 6.80 | 0.44 | 0.22 | | | GAM |
| Manganese 54 | 13966-31-9 | U | | 0.026 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.028 | 0.050 | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.035 | | U | GAM |
| Cesium 137 | 10045-97-3 | 0.038 | 0.029 | 0.028 | 0.10 | | GAM |
| Radium 226 | 13982-63-3 | 0.274 | 0.059 | 0.048 | 0.10 | | GAM |
| Radium 228 | 15262-20-1 | 0.412 | 0.12 | 0.11 | 0.20 | | GAM |
| Europium 152 | 14683-23-9 | U | | 0.088 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.097 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.097 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.441 | 0.054 | 0.049 | | | GAM |
| Thorium 232 | TH-232 | 0.412 | 0.12 | 0.11 | | | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.14 | | U | GAM |
| Uranium 238 | U-238 | U | | 3.1 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.14 | | U | GAM |

600-259 Verification

K
11/4/05

DATA SHEETS
Page 7
SUMMARY DATA SECTION
Page 17

000017

| |
|-----------------------------|
| Lab id <u>EBRLNE</u> |
| Protocol <u>Hanford</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>09/08/05</u> |

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000018

Eberline Services
W.O. No. R5-08-177-7709

Bechtel Hanford Inc.
SDG H3334

Case Narrative

Page 1 of 1

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H3334 was composed of seven solid (soil) samples designated under SAF No. B05-033 with a Project Designation of: 600-259 Verification.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-mail on September 19, 2005.

2.0 ANALYSIS NOTES

2.1 Tritium Analysis

No problems were encountered during the course of the analyses.

2.2 Technetium-99 Analysis

No problems were encountered during the course of the analyses.

2.3 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Melissa Mann

Melissa C. Mannion
Senior Program Manager

9/19/05

Date

000019

| | | | | | | | |
|---------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|-------------|
| Bechtel Hanford Inc. | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | | | B05-033-01 | Page 1 of 1 |
| Collector Fahlberg/Gale/St Joun | Company Contact M. HAASS | Telephone No. 373-6372 | Project Coordinator KESSNER, JH | | Price Code | Data Turnaround | |
| Project Designation 600-259 Verification | Sampling Location 600-259 Lysimeter Site | <i>H3334 (7709)</i> | | SAF No. B05-033 | Air Quality <input type="checkbox"/> | 15 Days | |
| Ice Chest No. <i>EPC 03-102</i> | Field Logbook No. EL 1395-11 | COA RG62592000 | Method of Shipment Fed EX | | | | |
| Shipped To EBERLINE SERVICES LIONVILLE | Offsite Property No. <i>A050309</i> | | Bill of Lading/Air Bill No. SEE OSPC | | | | |
| POSSIBLE SAMPLE HAZARDS/REMARKS <i>Non Rad Sample, No Activity Report Required</i> | | Preservation None | | | | | |
| Special Handling and/or Storage <i>None</i> | | Type of Container aG | | | | | |
| | | No. of Container(s) 1 | | | | | |
| | | Volume 1000mL | | | | | |
| SAMPLE ANALYSIS | | | | See item (1) in Special Instructions | | | |
| Sample No. | Matrix * | Sample Date <i>8.23.05</i> | Sample Time <i>1005</i> | | | | |
| J03WM5 | SOIL | <i>8.23.05</i> | <i>1005</i> | X | | | |
| J03WM6 | SOIL | <i>8.23.05</i> | <i>1012</i> | X | | | |
| J03WM7 | SOIL | <i>8.23.05</i> | <i>1023</i> | X | | | |
| J03WM8 | SOIL | <i>8.23.05</i> | <i>1039</i> | X | | | |
| J03WM9 | SOIL | <i>8.23.05</i> | <i>1005</i> | X | | | |
| CHAIN OF POSSESSION | | | | Sign/Print Names | | | |
| Relinquished By/Removed From <i>R. Fahlberg</i> | Date/Time <i>8.23.05</i> | Received By/Stored In <i>Fed Ex</i> | Date/Time | SPECIAL INSTRUCTIONS | | | |
| Relinquished By/Removed From <i>FED EX</i> | Date/Time <i>08/24/05</i> | Received By/Stored In <i>RFU</i> | Date/Time <i>08/24/05 9:21W</i> | (1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60); Gamma Spec - Add-on (Cesium-134, Manganese-54); Technetium-99; Tritium - H3 | | | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | | | | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | | | | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | | | | |
| LABORATORY SECTION | Received By | Title | | | | | Date/Time |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | | | | | Date/Time |

Matrix *

S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W=Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WL=Wipe
L=Liquid
V=Vegetation
X=Other

| | | | | | | | | |
|---------------------------------------------------------------------------------------|------------------------------|---------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bechtel Hanford Inc. | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | | | B05-033-03 | Page 1 of 1 | |
| Collector Fahlberg/Gale/St Joun | | Company Contact M. HAASS | Telephone No. 373-6372 | Project Coordinator KESSNER, JH | Price Code | Data Turnaround | | |
| Project Designation 600-259 Verification | | Sampling Location 600-259 Lysimeter Site | H3334 (7709) | SAF No. B05-033 | | Air Quality | 15 Days | |
| Ice Chest No. ERC OS 102 | | Field Logbook No. EL 1395-11 | COA RG62592000 | Method of Shipment Fed EX | | | | |
| Shipped To EBERLINE SERVICES / LIONVILLE | | Offsite Property No. AD5030x | | Bill of Lading/Air Bill No. SEE OSPC | | | | |
| POSSIBLE SAMPLE HAZARDS/REMARKS <i>Non Rad Sample, No Activity Report Required</i> | | Preservation | None | | | | | |
| Special Handling and/or Storage <i>None</i> | | Type of Container | aG | | | | | |
| | | No. of Container(s) | 1 | | | | | |
| | | Volume | 1000mL | | | | | |
| SAMPLE ANALYSIS | | | | See item (1) in Special Instructions. | | | | |
| Sample No. | Matrix * | Sample Date | Sample Time | | | | | |
| J03X41 | SOIL | 8-23-05 | 1043 | X | | | | |
| J03X42 | SOIL | 8-23-05 | 1049 | X | | | | |
| | | | | | | | | |
| | | | | | | | | |
| CHAIN OF POSSESSION | | | | SIGN/PRINT NAMES | | | | |
| Relinquished By/Removed From <i>R. Fahlberg</i> | Date/Time <i>8-23-05</i> | Received By/Stored In <i>Fed EX</i> | Date/Time | SPECIAL INSTRUCTIONS (1) Gamma Spectroscopy (TCL List) {Cesium-137, Cobalt-60}; Gamma Spec - Add-on {Cesium-134, Manganese-54}; Technetium-99; Tritium - H3 | | | | Matrix * |
| Relinquished By/Removed From <i>FED EX</i> | Date/Time <i>08/24/05</i> | Received By/Stored In <i>MW</i> | Date/Time <i>08/24/05 9:30</i> | | | | | S=Soil SE=Sediment SO=Solid SI=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | | | | | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | | | | | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | | | | | |
| LABORATORY SECTION | Received By | Title | | | | | | Date/Time |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | | Date/Time | | | | |

Appendix 5
Data Validation Supporting Documentation

000022

APPENDIX A
RADIOCHEMICAL DATA VALIDATION CHECKLIST

| VALIDATION LEVEL: | A | B | C | D | E |
|-----------------------------|--------------|--------------|---------------------|--------------------|---|
| PROJECT: | 600-257 | | DATA PACKAGE: H3334 | | |
| VALIDATOR: | TLC | LAB: FB | DATE: 11/4/05 | | |
| | | | SDG: | H3334 | |
| ANALYSES PERFORMED | | | | | |
| Gross Alpha/Beta | Strontium-90 | Techneium-99 | Alpha Spectroscopy | Gamma Spectroscopy | |
| Total Uranium | Radium-226 | Tritium | | | |
| SAMPLES/MATRIX | | | | | |
| J03WMS J03WMC J03WM7 J03WMS | | | | | |
| J03WM5 J03X41 J03X42 | | | | | |
| Soil | | | | | |

1. Completeness N/A

Technical verification forms present? Yes No N/A

Comments: _____

2. Initial Calibration (Levels D, E) N/A

Instruments/detectors calibrated? Yes No N/A

Initial calibration acceptable? Yes No N/A

Standards NIST traceable? Yes No N/A

Standards Expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

040023

3. Continuing Calibration (Levels D, E)

X N/A

Calibration checked within required frequency? Yes No N/A

Calibration check acceptable? Yes No N/A

Calibration check standards traceable? Yes No N/A

Calibration check standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

4. Background Counts (Levels D, E) N/A

Background Counts checked within required frequency? Yes No N/A

Background Counts acceptable? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

5. Blanks (Levels B, C, D, E) N/A

Method blank analyzed within required frequency? Yes No N/A

Method blank results acceptable? Yes No N/A

Analytes detected in method blank? Yes No N/A

Field blank(s) analyzed? Yes No N/A

Field blank results acceptable? Yes No N/A

Analytes detected in field blank(s)? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: No FB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) N/A

LCS /BSS analyzed within required frequency? Yes No N/A

LCS/BSS recoveries acceptable? Yes No N/A

LCS/BSS traceable? (Levels D,E) Yes No N/A

LCS/BSS expired? (Levels D,E) Yes No N/A

LCS/BSS levels correct? (Levels D,E) Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments:

7. Chemical Carrier Recovery (Levels C, D, E) N/A

Chemical carrier added? Yes No N/A

Chemical recovery acceptable? Yes No N/A

Chemical carrier traceable? (Levels D, E) Yes No N/A

A90025

Chemical carrier expired? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

Comments: _____

8. Tracer Recovery (Levels C, D, E) N/A

Tracer added? Yes No N/A

Tracer recovery acceptable? Yes No N/A

Tracer traceable? (Levels D, E) Yes No N/A

Tracer expired? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

Comments: _____

9. Matrix Spikes (Levels C, D, E) N/A

Matrix spike analyzed? Yes No N/A

Spike recoveries acceptable? Yes No N/A

Spike source traceable? (Levels D, E) Yes No N/A

Spike source expired? Levels D, E) Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: No MS - T 3H

10. Duplicates (Levels C, D, E) N/A

Duplicates Analyzed at required frequency? Yes No N/A

RPD Values Acceptable? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: _____

11. Field QC Samples (Levels C, D E) N/A

Field duplicate sample(s) analyzed? Yes No N/A

Field duplicate RPD values acceptable? Yes No N/A

Field split sample(s) analyzed? Yes No N/A

Field split RPD values acceptable? Yes No N/A

Performance audit sample(s) analyzed? Yes No N/A

Performance audit sample results acceptable? Yes No N/A

Comments: _____

No FS or PA

12. Holding Times (All levels)

Are sample holding times acceptable? Yes No N/A

Comments: _____

QA0027

13. Results and Detection Limits (All Levels) N/A

Results reported for all required sample analyses? Yes No N/A

Results supported in raw data? (Levels D, E) Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E) Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: 5 nm

006028

Appendix 6
Additional Documentation Requested by Client

000029

E B E R L I N E S E R V I C E S / R I C H M O N D
SAMPLE DELIVERY GROUP H3334

R508177-09

Method Blank

M E T H O D B L A N K

| | | |
|-----------------------------------|--------------------------------------|------------------|
| SDG <u>7709</u> | Client/Case no <u>Hanford</u> | SDG <u>H3334</u> |
| Contact <u>Melissa C. Mannion</u> | Contract No. <u>630</u> | |
| Lab sample id <u>R508177-09</u> | Client sample id <u>Method Blank</u> | |
| Dept sample id <u>7709-009</u> | Material/Matrix _____ | <u>SOLID</u> |
| | SAF No <u>B05-033</u> | |

| ANALYTE | CAS NO | RESULT pCi/g | 2σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST |
|---------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Tritium | 10028-17-8 | -4.53 | 3.7 | 6.6 | 400 | U | H |
| Technetium 99 | 14133-76-7 | -0.006 | 0.17 | 0.57 | 15 | U | TC |
| Potassium 40 | 13966-00-2 | U | | 0.34 | | U | GAM |
| Manganese 54 | 13966-31-9 | U | | 0.013 | | UX | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.017 | 0.050 | U | GAM |
| Cesium 134 | 13967-70-9 | U | | 0.019 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.018 | 0.10 | U | GAM |
| Radium 226 | 13982-63-3 | U | | 0.031 | 0.10 | U | GAM |
| Radium 228 | 15262-20-1 | U | | 0.069 | 0.20 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.037 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.043 | 0.10 | U | GAM |
| Europium 155 | 14391-16-3 | U | | 0.046 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.022 | | U | GAM |
| Thorium 232 | TH-232 | U | | 0.069 | | U | GAM |
| Uranium 235 | 15117-96-1 | U | | 0.062 | | U | GAM |
| Uranium 238 | U-238 | U | | 2.5 | | U | GAM |
| Americium 241 | 14596-10-2 | U | | 0.10 | | U | GAM |

600-259 Verification

QC-BLANK 54175

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 8

000030

| |
|-----------------------------|
| Lab id <u>EBRLNE</u> |
| Protocol <u>Hanford</u> |
| Version <u>Ver 1.0</u> |
| Form <u>DVD-DS</u> |
| Version <u>3.06</u> |
| Report date <u>09/08/05</u> |

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3334

R508177-08

Lab Control Sample

LAB CONTROL SAMPLE

| | | |
|----------------------------|-------------------------------------|-----------|
| SDG 7709 | Client/Case no Hanford | SDG H3334 |
| Contact Melissa C. Mannion | Contract No. 630 | |
| Lab sample id R508177-08 | Client sample id Lab Control Sample | |
| Dept sample id 7709-008 | Material/Matrix | SOLID |
| | SAF No B05-033 | |

| ANALYTE | RESULT pCi/g | 2 σ ERR (COUNT) | MDA pCi/g | RDL pCi/g | QUALI- FIERS | TEST | ADDED pCi/g | 2 σ ERR pCi/g | REC % | 3 σ LMITS (TOTAL) | PROTOCOL LIMITS |
|---------------|-----------------|---------------------------|--------------|--------------|-----------------|------|----------------|-------------------------|----------|-----------------------------|--------------------|
| Tritium | 894 | 17 | 6.3 | 400 | H | | 953 | 38 | 94 | 84-116 | 80-120 |
| Technetium 99 | 119 | 3.1 | 0.60 | 15 | TC | | 120 | 4.8 | 99 | 84-116 | 80-120 |
| Cobalt 60 | 0.678 | 0.073 | 0.037 | 0.050 | GAM | | 0.679 | 0.027 | 100 | 72-128 | 80-120 |
| Cesium 137 | 0.680 | 0.061 | 0.048 | 0.10 | GAM | | 0.677 | 0.027 | 100 | 73-127 | 80-120 |

600-259 Verification

| |
|--------------|
| QC-LCS 54174 |
|--------------|

LAB CONTROL SAMPLES

Page 1

SUMMARY DATA SECTION

Page 9

0000031

| |
|----------------------|
| Lab id EBERLINE |
| Protocol Hanford |
| Version Ver 1.0 |
| Form DVD-LCS |
| Version 3.06 |
| Report date 09/08/05 |

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3334

R508177-10

J03WM8

DUPLICATE

| | | |
|----------------------------|--------------------------|----------------------------------------------|
| SDG 7709 | Client/Case no Hanford | SDG H3334 |
| Contact Melissa C. Mannion | Contract No. 630 | |
| DUPLICATE | ORIGINAL | |
| Lab sample id R508177-10 | Lab sample id R508177-04 | Client sample id J03WM8 |
| Dept sample id 7709-010 | Dept sample id 7709-004 | Location/Matrix 600-259 Lysimeter Site SOLID |
| | Received 08/24/05 | Collected/Weight 08/23/05 10:39 1435 g |
| % solids 98.7 | % solids 98.7 | Custody/SAF No B05-033-01 B05-033 |

| ANALYTE | DUPLICATE | 2σ ERR | MDA | RDL | QUALI- | TEST | ORIGINAL | 2σ ERR | MDA | QUALI- | RPD | 3σ PROT |
|---------------|-----------|---------|-------|-------|--------|------|----------|---------|-------|--------|-----|-----------|
| | pCi/g | (COUNT) | pCi/g | pCi/g | FIEERS | | pCi/g | (COUNT) | pCi/g | FIEERS | % | TOT LIMIT |
| Tritium | -3.17 | 2.8 | 5.0 | 400 | U | H | -3.38 | 3.0 | 5.3 | U | - | |
| Technetium 99 | 0.127 | 0.18 | 0.53 | 15 | U | TC | -0.107 | 0.16 | 0.55 | U | - | |
| Potassium 40 | 11.6 | 0.72 | 0.25 | | | GAM | 11.2 | 0.62 | 0.27 | | 4 | 34 |
| Manganese 54 | U | | 0.033 | | UX | GAM | U | | 0.027 | UX | - | |
| Cobalt 60 | U | | 0.035 | 0.050 | U | GAM | U | | 0.028 | U | - | |
| Cesium 134 | U | | 0.043 | | U | GAM | U | | 0.036 | U | - | |
| Cesium 137 | U | | 0.036 | 0.10 | U | GAM | U | | 0.027 | U | - | |
| Radium 226 | 0.432 | 0.062 | 0.057 | 0.10 | | GAM | 0.441 | 0.060 | 0.058 | | 2 | 44 |
| Radium 228 | 0.571 | 0.13 | 0.14 | 0.20 | | GAM | 0.646 | 0.13 | 0.13 | | 12 | 55 |
| Europium 152 | U | | 0.080 | 0.10 | U | GAM | U | | 0.064 | U | - | |
| Europium 154 | U | | 0.12 | 0.10 | U | GAM | U | | 0.094 | U | - | |
| Europium 155 | U | | 0.11 | 0.10 | U | GAM | 0.087 | 0.061 | 0.093 | U | - | |
| Thorium 228 | 0.534 | 0.040 | 0.040 | | | GAM | 0.494 | 0.032 | 0.031 | | 8 | 35 |
| Thorium 232 | 0.571 | 0.13 | 0.14 | | | GAM | 0.646 | 0.13 | 0.13 | | 12 | 55 |
| Uranium 235 | U | | 0.13 | | U | GAM | U | | 0.11 | U | - | |
| Uranium 238 | U | | 4.3 | | U | GAM | U | | 3.3 | U | - | |
| Americium 241 | U | | 0.23 | | U | GAM | U | | 0.20 | U | - | |

600-259 Verification

QC-DUP#4 54176

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 10

000032

| |
|----------------------|
| Lab id EBERLINE |
| Protocol Hanford |
| Version Ver 1.0 |
| Form DVD-DUP |
| Version 3.06 |
| Report date 09/08/05 |